(12) PATENT ABSTRACT (11) Document No. AU-A-39180/89
(19) AUSTRALIAN PATENT OFFICE

(54) Title
NEEDLE SYRINGE WITH AUTOMATIC INJECTION

(51)[4] International Patent Classification(s)
A61M 005/32 A61M 005/315 A61M 005/20

(21) Application No. : 39180/89 (22) Application Date : 01.08.89

(43) Publication Date : 07.02.91

(71) Applicant(s)
ROBERT LESLIE WAKELIN, CO.

(72) Inventor(s)
ROBERT LESLIE WAKELIN

(57) Claim

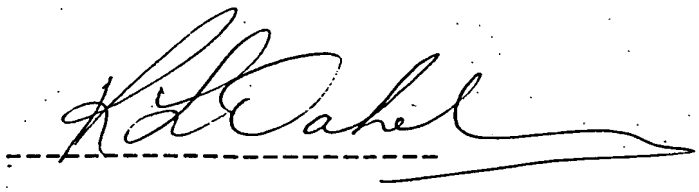
1. Automatic Injection Non Reusable Needle Retracting Syringe with an automatic injection of the total contents but still providing for aspiration testing consisting of a syringe barrel 3.and containing the piston 4. which is moved to the bottom of the barrel 3. by the force of the pre-compressed internal helical compression spring 20. initiated by the release cam 10. being part of the plunger arm 9. which is then completely and mechanically seperated from the mechanism causing the total discharge of the contents in the syringe barrel 3..

6. A hypodermic syringe of the type which includes a needle and a barrel having a liquid chamber containing a piston, wherein the syringe includes a plunger arm which enables the piston to travel in a direction so as to draw liquid into the liquid chamber, but which can urge the piston in the opposite direction only to an extent necessary to permit aspiration testing, said syringe including means which, if said plunger is urged in said opposite direction beyond said extent, separate said plunger arm from said piston and ensure that all said liquid drawn into said chamber is expelled automatically.

See figure 3.

I, REOBERT LESLIE WAKELIN, do hereby certify that the following 14 pages, comprising 10 pages of specification, 2 pages of claims and 2 pages of drawings, are a true and correct copy of the specification, claims, and drawings of which they purport to be a copy.

Dated this thirtyfirst day of July, 1989



AUSTRALIA

Patents Act 1952

COMPLETE SPECIFICATION

Applicant: ROBERT LESLIE WAKELIN

Address : 37-51 The Crescent, Manly, New South Wales

Address for Service: ~~37-51 The Crescent Manly NSW 2095~~ Crysilia Moore Crysilia Solicitors & Attorneys PO Box 373 Collaroy Beach NSW 2097

Complete Specification for an invention entitled:

"NEW AND IMPROVED SYRINGE"

The following statement is a full description of this invention, including the best method of performing it known to me: -

This invention relates to a device suitable for the injection of fluids into the human arteries veins or other tissues, by medical staff or drug users.

Today disposable syringes are widely used in hospitals, clinics as well as dental clinics etc in order to prevent the transmission of infection. Health authorities also strongly advise that drug addicts and the like use disposable syringes because the danger of infection is considered to be extremely large among this group of people. The use of disposable syringes also cause great problems in connection with safe disposal of the large number of used disposable syringes, because disposal and destruction must take place in such a manner that other persons are not exposed to any danger of infection when touching the needles of the disposable syringes.

Disposable syringes should therefore be designed so that only one person can inject the total contents and not be able to share any part of these contents with a second person and the syringe can only be used once and then after use the needle

is automatically and can not be prevented by the user from being retracted completely within the barrel of the syringe.

The object of the present invention is to provide a disposable syringe which will overcome and prevent the problems as stated above.

The invention is therefore said to reside in the design of the Automatic Injection Non - Reusable Needle Retracting Syringe and according to the invention as presented in the characterizing part of claim 1. After the syringe has been filled and any trapped air has been aspiration tested and the actual injection started by initially pressing the syringe plunger inwards a short distance, the automatic injection of the contents then takes place, by the action of the now released compression spring applying forward pressure on the piston. This action continues until all the contents of the syringe have been expelled through the needle .

At no time can this action be stopped by the user of the syringe or to only partially use the syringes contents and make the remainder available to a second person.

By designing the hypodermic syringe according to the invention as presented in the characterizing part of claim 2. the piston on reaching the bottom position cannot be again withdrawn, as it has been completely isolated mechanically from the plunger arm, which in turn has been mechanically locked to the barrel of the syringe, and only permitting very limited in or out movement. This is an added safeguard against any further attempt to use the syringe.

The design of the hypodermic syringe according to the invention as presented in the characterizing part of claim 3. is the further safeguard in the design to prevent other persons being infected under any circumstances when handling a syringe with an exposed infected needle, is by the automatic and again unstoppable

retracting inside the barrel of the syringe by the inbuilt mechanisms action of the exposed needle. The triggering of this action occurrs imediately when the piston reaches the bottom of the syringe and at the end of the ejection of all the contents of the syringe.

The hypodermic syringe according to the invention as presented in the characterizing part of the claim 4. the spring effect on the piston is obtained by a simple reliable and inexpensive manner, since ordinary helical springs are standard equiptment which are available in large quantities at very low prices.

By designing the hypodermic syringe according to the invention as presented in characterizing part of the claim 5. is the unique design of the moulded sliding sleeve which permits by its design, the embodiment of the mechanical and thereby the resultant functions and actions of the claims 1,2,3 and 4.

The invention will be now discussed in relation to a preferred embodiment of the invention acorrding to the accommpanying drawings in which :

FIG. 1. shows a section through a hypodermic syringe according to a first embodiment of the invention and prior to usage.

FIG. 2. shows a section through the same hypodermic syringe with the plunger extended outwards and filled ready for use.

FIG. 3. shows a section rotated 90° of the same hypodermic syringe but after usage.

FIG. 4. shows a section on a larger scale of the sliding sleeve and needle mechanism befor usage.

FIG. 5 shows a sector or a larger scale of FIG. 4 but a view rotated 90° and beforeusage.

Now looking more closely at the drawings the hypodermic syringe comprises of a moulded barrel, in fig. 1 the protective cover 1. is removed exposing the needle 2. extending outwards from the barrel 3.

Inside is the moulded piston 4. and the piston arm 5. the moulded sliding sleeve 6. which has external ratchet type grooves 7. , the sleeve is located in position by the expanded outward pawls or spigot arms 8. of the piston arm 5.

Now refer to the expanded drawings 4 and 5 located between the piston arm 5. and the sliding sleeve 8. is the moulded plunger arm 9. included in this moulding are the two cams 10. and the locking tabs 11. which locate the plunger arm 9. in position to the internal groove 12. of the sliding sleeve 6. Also held captive and under compression are the two activating pawls or spigot arms 13. by the moulded gage section 14.

The needle 2. is located and held in position by the restraining pawls or spigots arms 15. and the disc flange 16. of the needle 2. , at the same time the needle tension spring 17. is restrained between the hole 18. in the end of the needle and the moulded locating pin 19. positioned at the right hand side of the barrel 3.

The helical compression spring 20. is held under compression between the piston 4. and the moulded ratchet pawl or spigot arm section 21.

located by the circular slot 22. moulded inside the barrel 3.

It will now be seen that as shown in fig. 1. with the protective needle cover 1. removed, the hypodermic syringe can be filled by drawing or pulling the plunger arm 9. outwards, as the plunger arm 9. moves backwards the locking tabs 11.which engage the inside groove 12. of the sliding sleeve 6. which will also move backwards.

Because the sliding sleeve 6. is mechanically locked by the pawls or spigot arms 8. of the piston arm 5. will cause the piston 4. to move towards the rear of the barrel 3. and progressively draw in the desired fluids, to any predetermined volume. At this point of time the outside ratchet moulded grooves 7. of the sliding sleeve 6. are being progressively engaged by the pawls or spigot arms section 21.

The helical compression piston spring 20. is now also being progressively compressed, fig. 2 shows the hypodermic syringe ready to inject the contents . Note that as the force of the helical compression piston spring 20. is contained between the locked piston arm 5. and the sliding sleeve 6. via the ratchet pawls or spigot arm section 21. the plunger arm 9. has limited movement, dictated by the width of the locating groove 22. moulded inside the barrel 3.

This controlled movement provides the user the

means to aspirate test the syringe contents and remove any trapped air.

To commence the injection the user has only to push the plunger arm 9. a short distance further into the barrel 3. of the syringe. this action will then cause the following actions or movements to take place.

A. The small cams 10. at the front end of the plunger arm 9.will depress the pawls or spigot arms 8. and release the piston arm 5.

B. The helical compressed piston spring 20. will then start to move the piston 4. forward ejecting the total contents through the needle.

C. As the piston arm 5. moves forward its two moulded needle activating pawls or spigots 13. will be released from the captive moulded cage 14. and spring outwards.

D. As the piston is forced to the bottom of the barrel 3. the needle restraining pawls or spigot arms 15. will be distorted outwards by the cam action of the now extended needle activating pawls or spigot arms 13. This will now release the restrained needle 2. which will instantly withdraw its exposed section completely inside the syringe barrel 3. by the force of the needle tension spring 17.

E. The hypodermic syringe is now completely

harmless, as the needle 2. is contained completely inside the syringe barrel 3., also the plunger arm 9. cannot be moved as it is locked to the barrel 3. mechanically by the sliding sleeves 6. internal moulded groove 12. and its own locking tabs 11. At the same time the piston arm 5. is mechanically disconnected from the plunger arm 9.

It will be realised that the embodiement shown in fig. 1,2 and 3 should be taken as an illustrative embodiment for explanation of the mode of operation of the hypodermic syringe. It will be obvious to anyone skilled in the art that the details, particularly concerning the embodiment of the piston arm 5. and the sliding sleeve 6. and the plunger arm 9. and the embodiment of the locking mechanisms of the ratchet pawl or spigot arms section 21. with the sliding sleeve 6. moulded ratchet grooves can be designed in many other ways than the one which is shown and described.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1. Automatic Injection Non Reusable Needle Retracting Syringe with an automatic injection of the total contents but still providing for aspiration testing consisting of a syringe barrel 3.and containing the piston 4. which is moved to the bottom of the barrel 3. by the force of the pre-compressed internal helical compression spring 20. initiated by the release cam 10. being part of the plunger arm 9. which is then completely and mechanically seperated from the mechanism causing the total discharge of the contents in the syringe barrel 3.

2. Hypodermic syringe according to claim 1. characterized in that at the same time the plunger arm 9. is mechanically locked by its locking tabs 11. interlocking with the internal groove 12. of the sliding sleeve 6. which is also mechanically lockedand prevented from moving by the ratchet type moulded grooves 7. which are interlocked with the pawls or spigot arms section 21. which are located by the internal locating groove 22. in the inner wall of the barrel 3.completely locking the plunger.

3. Hypodermic syringe according to claim 2. characterized in that the locking of the sliding sleeve 6. in the top end of the barrel 3.causes the activating pawls or spigots 13. to disengage from the cage 14. and spring apart causing the

distortion of the needle restraining pawls or spigot arms 13. and release the needle 2. resulting in its total retraction inside the barrel by the force applied to it from the needle tension spring 17.

4. Hypodermic syringe to claim 1. characterized in that the spring pressure on the piston 4. is established by means of a pre-set helical compression spring 17. situated inside the barrel 3. and located between the piston 4. and the pawl or spigot arm section 21.

5. Hypodermic syringe to claim 1,2, and 3 characterized in that the unique design and construction of the sliding sleeve 6. permits by its design the embodiment of the mechanical action and thereby the resultant functions of the claims 1,2 and 3.

---

6. A hypodermic syringe of the type which includes a needle and a barrel having a liquid chamber containing a piston, wherein the syringe includes a plunger arm which enables the piston to travel in a direction so as to draw liquid into the liquid chamber, but which can urge the piston in the opposite direction only to an extent necessary to permit aspiration testing, said syringe including means which, if said plunger is urged in said opposite direction beyond said extent, separate said plunger arm from said piston and ensure that all said liquid drawn into said chamber is expelled automatically.

7. A hypodermic syringe as claimed in claim 6, wherein the syringe further includes a mechanism for automatic retraction of said needle within said barrel after said liquid has been expelled.

8. A hypodermic syringe as claimed in claim 6 or 7 substantially as herein described with reference to any one of the accompanying Drawings.

Dated this thirtyfirst day of July, 1989

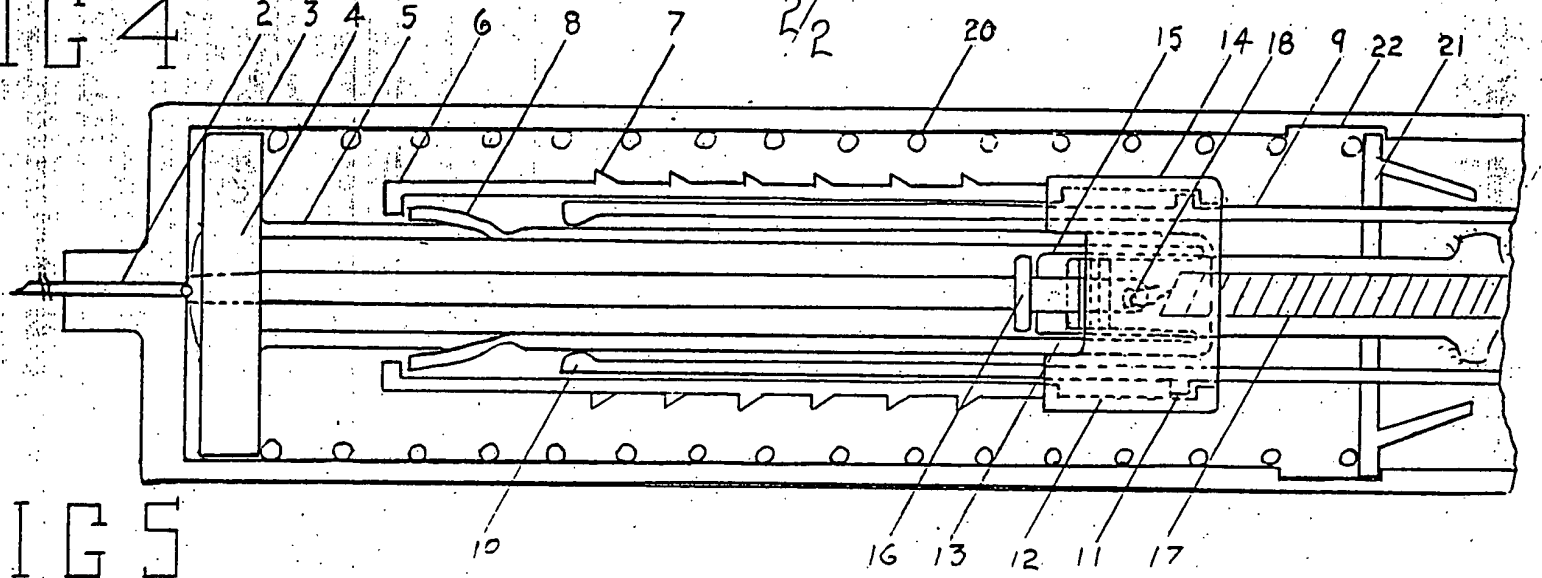
ROBERT LESLIE WAKELIN

FIG 1

FIG 2

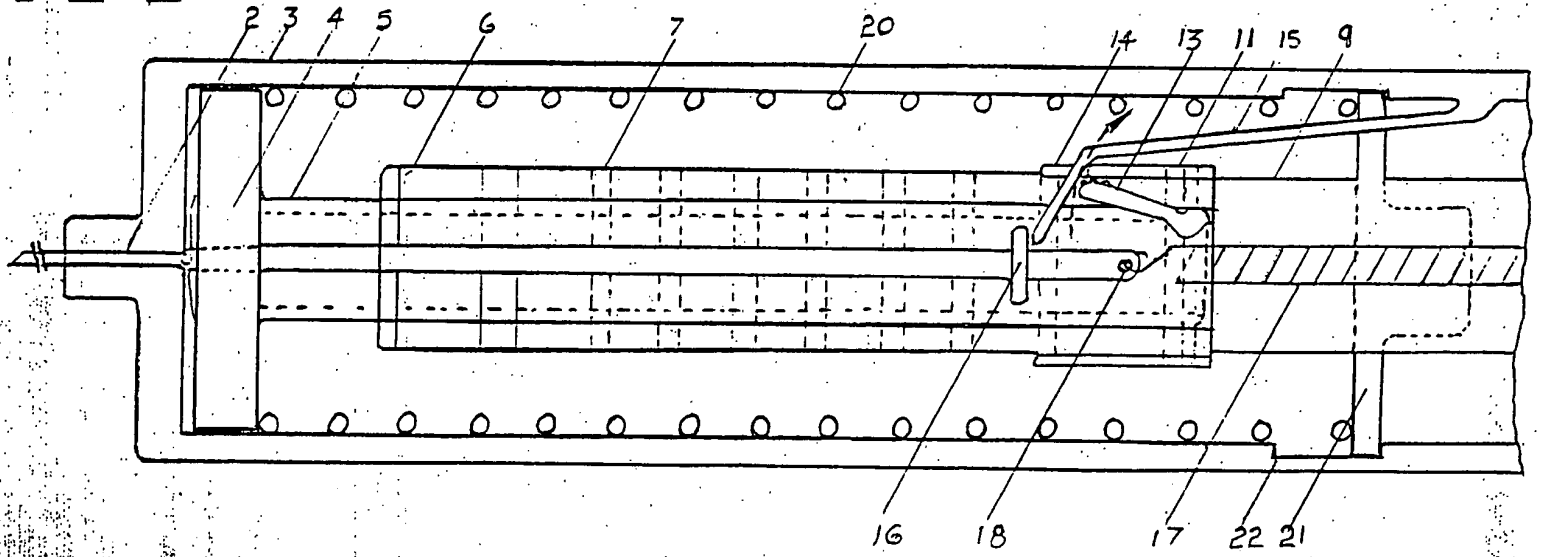
FIG 3

FIG 4


2
3
4
5
6
8
7
20
15
14
18
9
22
21
10
16
13
12
11
17

2/2

FIG 5


2
3
4
5
6
7
20
14
13
11
15
9
16
18
17
22
21